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COVID-19: PATHPHYSIOLOGY, TRATMENT AND MANAGEMENT

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ABSTRACT

Epidemically increased evidence reveals that the Covid-19 is the SARS and the MERS virus. This pandemic is affecting nearly whole World. Covid-19 was started from the Wuhan city of China in 2019 and now it gradually affecting the whole World. In this paper we are discussing about the various symptoms of the Covid-19, they are fever, dry cough, fatigue etc. there are the three most commonly found symptoms of the Covid-19 in near about 80% patients is fever and dry cough. Here the Path physiology of the Covid-19 is discussed briefly and also mentioned that how the transmission of the Covid-19 happen. There are the various diagnostic methods of the Covid-19 which are Serology and NAAT Test are mentioned by the WHO and discussed in this article. There are the various types of samples taken; they are Sputum, Lavage, and Nasopharyngeal swab. These are the various samples and tests which are stated by the WHO till now for the Diagnosis of the Covid-19. Here in this paper discharge protocol of the Covid-19 patient is also mentioned, that tells that how and when the Covid-19 patient is discharged after the treatment from the hospital, and also what is the trend followed by India in present to deal or treat with the Covid-19 patient is mentioned in this paper.

KEYWORDS: Covid-19, SARS, Path physiology, Serology, Diagnostic methods, WHO.

INTRODUCTION

According to Nature, the increase of corona virus disease 2019 (COVID-19) is becoming unbeatable and has so far reached the certain epidemiological standard is to be proclaim a pandemic, having infected more than 3,870,958 cases in 190 countries. Therefore, a coordinated global response is seriously required to draw up health systems to meet this unrivalled challenge.[1] Nations that have been unsuitable enough to have been revealing this disease already have, paradoxically, very helpful lessons to pass on. While the containment

measures apply in China have-at least for the moment-bring down new cases by more than 90%, this depletion is not the case in further countries, including India.[2] India had 59,765 confirmed cases according to Health Ministry India till May 9, 2020 and 1,986 deaths. Only America has recorded more deaths due to this COVID-19 outbreak. The mean age of India was 60+ (63%) and 20-60 (27%) age groups and more than half of them (56%) were diabetic and almost (47%) have both hypertension and diabetes as well as some of them had cardiac disease also along with hypertensions and diabetes. Renal disease too was reported in several of those who died.

On March 25, 2020, the Indian Government applied remarkable measures to limit viral transmission-including restricting movement in the region of Indian states that minimize the possibility that people which are not infected come into contact with people who are infected.[3] The resolution is certainly bravery and important, but it is enough. Our national health system's capacity to efficaciously respond to the needs of those who are already infected and require an intensive care unit for acute respiratory distress syndrome (ARDS) and largely due to severe acute respiratory syndrome (SARS-COV-2) pneumonia is a matter of grave concern. Pointedly, the percentage of patients admitted to intensive care units (ICU) reported day to day in India.[4]

In the absence of any known efficacious therapy and because of the circumstances of a "public-health emergency", many drugs have been tried recently in the treatment for COVID-19 that includes a low-cost antimalarial drug Chloroquine and its derivative Hydroxychloroquine (HCQ), by the side of many other antiviral drugs.[5] Because HCQ has been approved in the treatment of type 2 diabetes in India since 2014 as third or fourth line drug. After research its show better results on patients infected with COVID-19 and diabetes. Reports assemble as now suggested that a number of drugs could have capability for the treating COVID-19.[6,7] Five hospitals, two from Ahmadabad and one each from Chennai, Jodhpur and Bhopal. Have so far been approved to conduct randomized controlled clinical trials under Who solidarity trial to find an effective treatment for COVID-19. The hospitals, including the All India Institutes Of Medical Science in Jodhpur, Apollo Hospitals in Chennai and B J Medical College and Civil hospitals in Ahmadabad, will be conducting clinical trials on four treatment protocols-remdesivir, combination of lopinavir and ritovir, hydroxychloroquine and lopinavir and ritonavir with interferon beta-1a.

Here, the path physiology of the Covid-19 is explained below.

Pathology of novel Corona virus (Covid-19)

The novel corona virus is also known as the SARS virus. Pathology of the Covid-19 till now is known, explained below in the three steps:

1) Spike surface of Glycoprotein-S of the virus binds with the host via receptor binding domain of Angiotensin converting enzyme 2 i.e. ACE2 which is mostly found in Type 2 alveolar cells.[8, 9]
2) Than the SARS Cov-2 attaches to the target cell, the viron releases RNA into the cell, than it initiates the replication of the virus that further disseminates to infect the more and more cells.[10,11]
3) SARS Cov-2 produces several virulence factors that further promotes shedding of new virons from host cells and inhibit immune response.[12]

In the given **figure:-1** Structure (Path physiology) of novel corona virus (Covid-19) is shown.

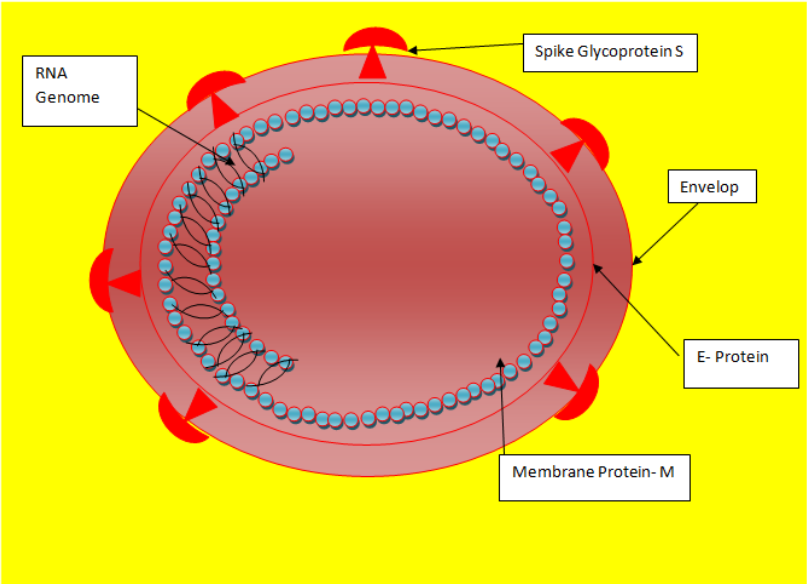


Figure 1: Structure (Path physiology) of Covid-19.

Mode of Spreading

People get infection through close contact that has the symptoms from the virus which includes cough and sneezing. Mostly corona virus spread from the air born zoonotic droplets.[13] Covid-19 replicates in epithelium that caused cellular damage and infection at infection site.[14] According to the study published in 2019, Angiotensin converting enzyme 2 (ACE 2), a membrane exopeptidase in receptor used by corona virus in entry to human cells.

Symptoms of Covid-19

Signs and symptoms of Covid-19 may appear or seen from 2-14 days after the exposure. Time after exposure and before having symptoms is called incubation period. From the table given below the most common symptoms found in the patients of Covid-19 are:

- Fever
- Dry cough
- Fatigue

There are also other symptoms which are found in the patients of Covid-19, these are mentioned in the table below. The rest of the symptoms are found in very less patients or the patient who are older in age or they are suffering from the other diseases.[15]

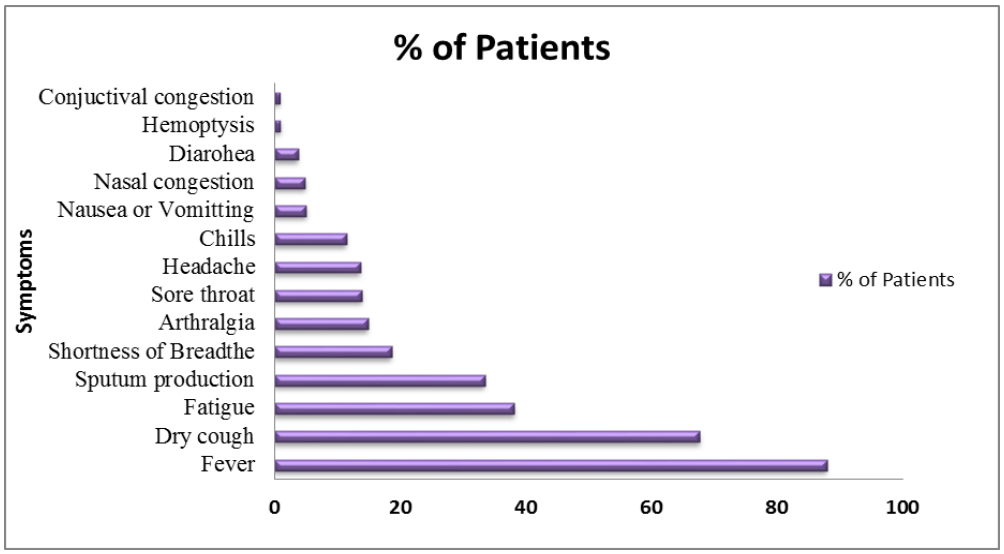


Table 1: Symptoms of Covid-19.[16,17]

Symptoms	% of Patients
Fever	87.9%
Dry cough	67.7%
Fatigue	38.1%
Sputum production	33.4%
Shortness of Breadth	18.6%
Arthralgia	14.8%
Sore throat	13.9%
Headache	13.6%
Chills	11.4%
Nausea or vomiting	5.0%
Nasal congestion	4.8%
Diarrhea	3.7%
Hemoptysis	0.9%
Conjunctival congestion	0.8%

Diagnostic, Testing of Covid-19

Due to lack of availability of the testing facility till date, but testing capacity is including quickly. The following recommendations have been made regarding diagnostic, testing and reporting are mentioned below"

- Take nasopharyngeal swab for Covid-19, polymerase chain reaction testing (RT-PCR). Check with your facility regarding test characteristics including sensitivity and specificity.[18,19]
- Differentiating Covid-19 from other circulating respiratory viruses is important particularly influenza, consider testing of usual respiratory pathogens, co infection has also been reported.[20]

The tests which are performed in the Patients of Covid-19 are NAAT and Serology. There is the Table: 2 given below which states that what are the diagnostic tests are performed of the patients of the Covid-19 and also tells about the type of samples which are taken from the patients at needed by the desired time.

Table 2: Specimens to be collected from Symptomatic Patients and Contacts.

Patient / Contact	Test	Type of Sample	Timing	Reference
Patient	NAAT	**Lower Respiratory Tract** • Sputum • Aspirate • Lavage **Upper Respiratory Tract** • Nasopharyngeal swab • Oropharyngeal swab • Nasopharyngeal wash **Consider stools, whole blood, urine, and if diseased, material from autopsy.**	Collect on presentation. Possibly repeated sampling to monitor clearance. Further research needed to determine effectiveness and reliability of repeated sampling.	[21, 22]

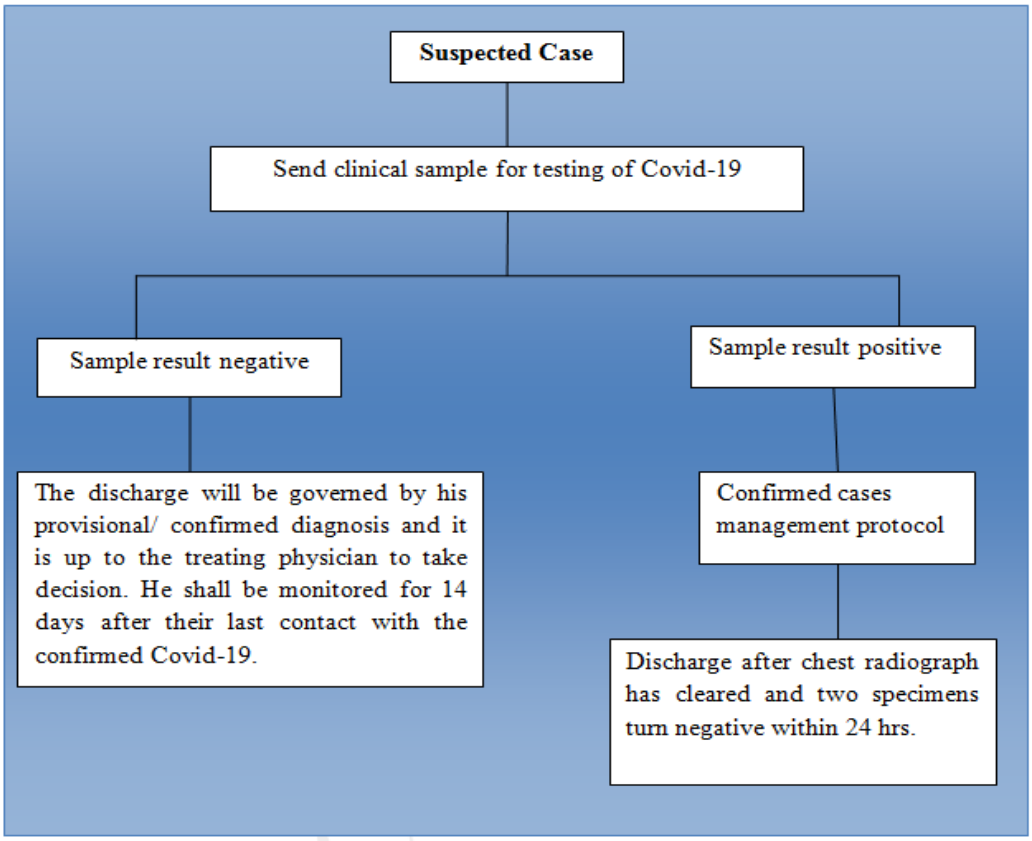
Patient	Serology	Serum from serological testing once validated and available.	Paired samples are necessary for confirmation with the initial sample collected in the first week of illness and the second ideally collected 2-4 weeks later. (optimal timing for convalescent sample needs to be established)	**[21]**
Contact	NAAT	Nasopharyngeal and oropharyngeal swabs.	With incubation period of last documented contact.	**[21,23]**
	Serology	Serum for serological testing once validated and available.	Baseline serum taken as early as possible within incubation period of contact and convalescent serum taken 2-4 weeks after last contact (optimal timing for convalescent samples needs to be established)	

Present Scenario of testing strategy in India

- All asymptomatic people who have undertaken International travel, they all should stay in home quarantine for 14 days.[24]
- People should be tested only if they become symptomatic (fever, cough, difficulty in breathing etc).[25]
- If the test result of the symptomatic people is positive, than they should be isolated and treated.[26]
- All contacts of laboratory positive cases should stay in home quarantine for 14 days.[27]
- They should be tested only, if they become symptomatic, if the test result is positive, than they should be isolated and treated.[26]
- Health care workers managing Covid-19 should be tested only if they become symptomatic.[28]

Discharge protocol

The discharge protocol of the patient of Covid-19 has been mentioned in the given flow chart[29]:



Flow chart 1 Discharge Protocol

Spread of Covid-19 in India

Covid-19 registered cases and the registered deaths in different States of India, as per report of Ministry of Health and Family Welfare, May, 14, 2020 is mentioned in the Table 3.

Table 3: Registered confirmed cases in India Reported by MHFW on May, 12.2020.

State / UT	Confirmed cases	Cured/ Discharged	Deaths
Andaman and Nicobar Islands	33	33	0
Andhra Pradesh	2137	1142	47
Arunachal Pradesh	1	1	0
Assam	80	39	02
Bihar	940	388	07
Chandigarh	187	28	03
Chhattisgarh	59	55	00
Dadar Nagar Haveli	01	00	00
Delhi	7998	2858	106
Goa	07	07	00
Gujarat	9267	3562	566
Haryana	793	418	11
Himachal Pradesh	66	39	02
Jammu & Kashmir	971	466	11
Jharkhand	173	79	03

Karnataka	959	451	33
Kerala	534	490	04
Ladakh	43	22	00
Madhya Pradesh	4173	2004	232
Maharashtra	25922	5547	975
Manipur	02	02	00
Meghalaya	13	10	01
Mizoram	01	01	00
Odisha	538	143	03
Puducherry	13	09	01
Punjab	1924	200	32
Rajasthan	4328	2459	121
Tamil Nadu	9227	2176	64
Telengena	1367	940	34
Tripura	155	16	00
Uttarakhand	72	46	01
Uttar Pradesh	3729	1902	83
West Bengal	2290	702	207
Total No. of Confirmed cases in India	78003	26235	2549

CONCLUSION

Covid-19 is the deadly disease that is first witnessed in Wuhan city of China. After that this disease is now spreading nearly whole world and it has also shown its harsh affect in some of the top economical countries. So in the above article we have discussed about the path physiology of Covid-19 that it tells that how the virus affects the person and how it is transmitted in the body. In the above study we have found the symptoms of the Covid-19, there are the three basic symptoms which are mostly found in the patients are fever, dry cough and fatigue, these are the most common symptoms of the Covid-19. Then there are the various tests which are performed to check the patients of Covid-19, two basic tests according to WHO are NAAT and Serology. Till now there is no clinically proven medicine is made for the treatment of Covid-19. The measures of to stay away from disease are just to take precautions and do not come in contact with the infected person. Covid-19 is transmitted by person to person,

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